

## 10 WATT POWER AMPLIFIER MODULE, 400 - 1000 MHz

### Features

- P1dB Output Power: 10 Watts
- Gain: 40 dB
- Output IP3: +54 dBm
- Single Positive Supply: +12V
- Thermally Compensated and Protected
- TTL DC Power Enable
- Unconditionally Stable
- Heat Sink/Fan Accessories Available

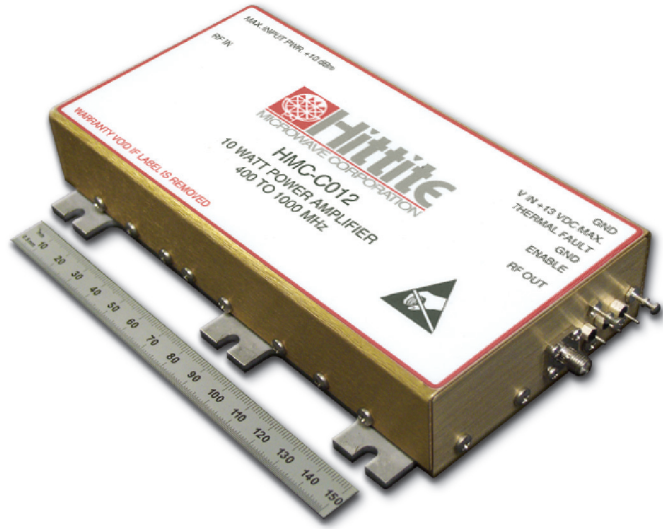
### Typical Applications

The HMC-C012 is ideal for:

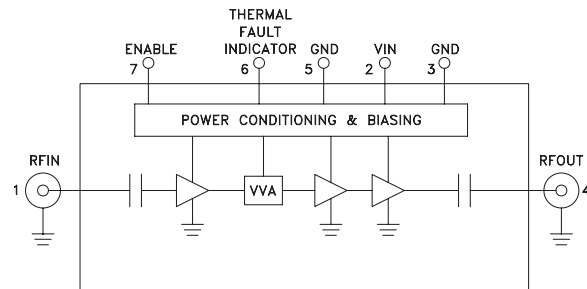
- Cellular/3G Infrastructure
- Automated Test Equipment (ATE)
- Laboratory Use

### General Description

The HMC-C012 is a 10 Watt Power Amplifier Module suitable for Cellular/3G repeaters, wireless data, laboratory use and ATE applications. This extremely robust PA module is DC blocked, internally regulated and over voltage protected. Thermal protection/fault circuitry automatically turns off DC power if base temperature exceeds +75 °C and restores power at < +55 °C.



### Functional Diagram

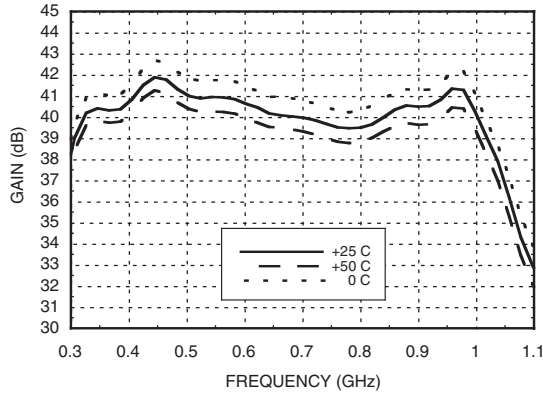


### Electrical Specifications, $T_A = +25^\circ \text{C}$ , $V_{IN} = +12\text{V}$

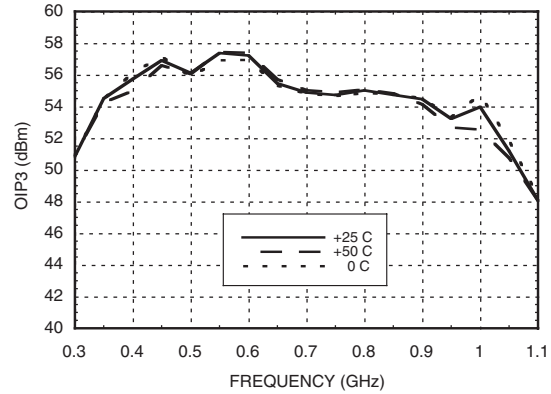
Parameter	Min.	Typ.	Max.	Units
Frequency Range	0.4 - 1.0			GHz
Gain	38	40		dB
Input Return Loss	9.5	12		dB
Output Return Loss	7.5	12		dB
Output Power for 1 dB Compression (P1dB)	9	10		W
Saturated Output Power (Psat)		42		dBm
Output Third Order Intercept (IP3) (Two-tone Input Power = -28 dBm each tone)		54		dBm
Channel Output Power for -60 dBc ACPR (CDMA-2000, 1.98 MHz offset)		36		dBm
Channel Output Power for -50 dBc ACPR (CDMA-2000, 885 kHz offset)		34		dBm
Second Harmonic at Output P1dB		-20		dBc
Third Harmonic at Output P1dB		-30		dBc
Spurious at Output P1dB		-65		dBc
Supply Current		6.5	7.0	A

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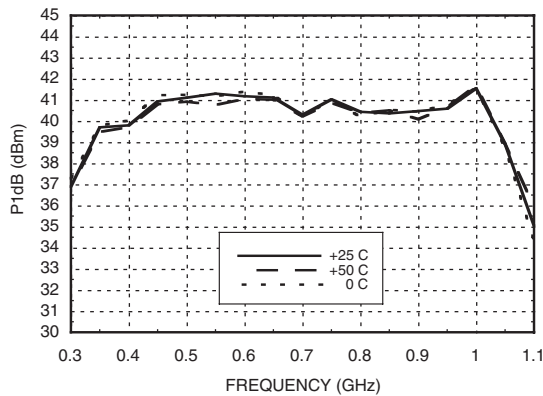
**Gain vs. Temperature**



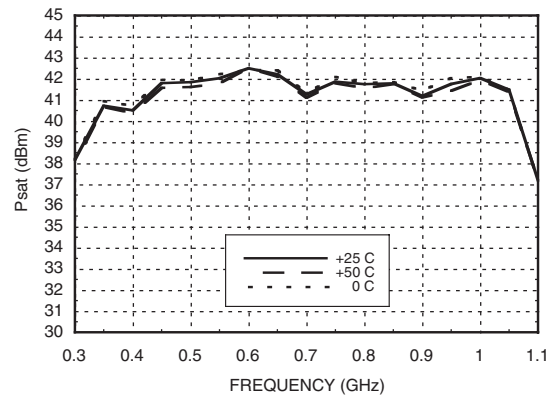
**Output IP3 vs. Temperature**



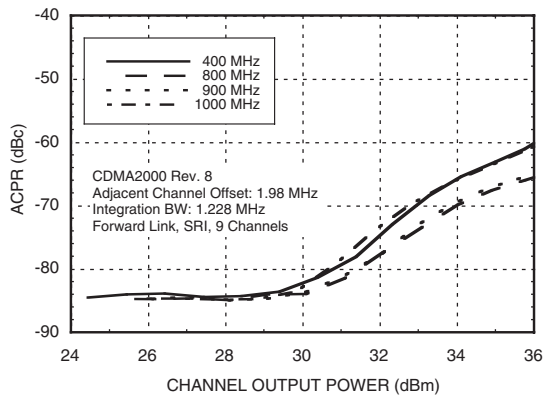
**P1dB vs. Temperature**



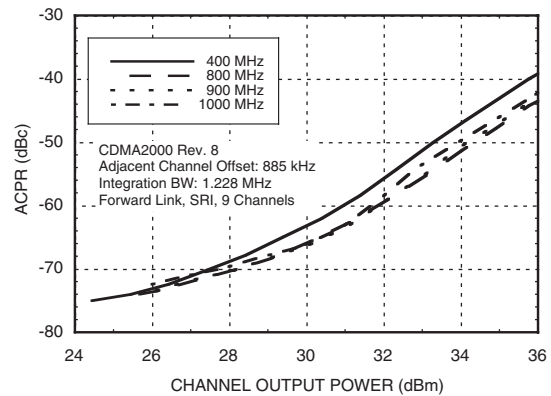
**Psat vs. Temperature**



**ACPR, CDMA-2000, 1.98 MHz Offset**

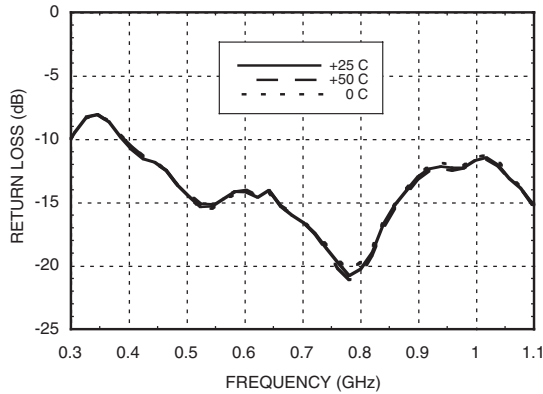


**ACPR, CDMA-2000, 885 kHz Offset**

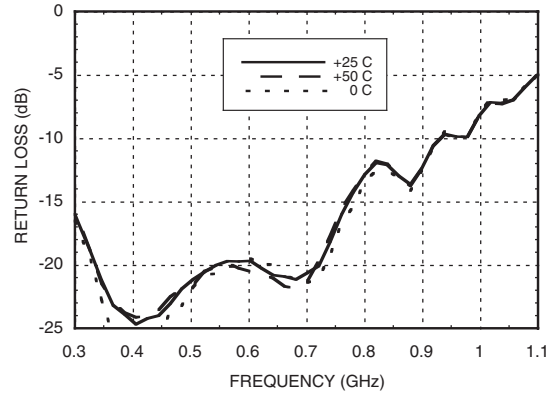


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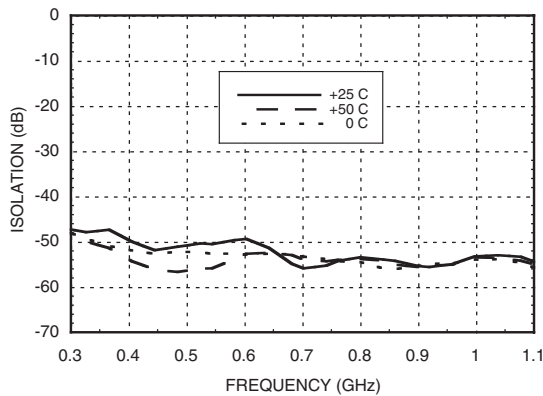
**Input Return Loss vs. Temperature**



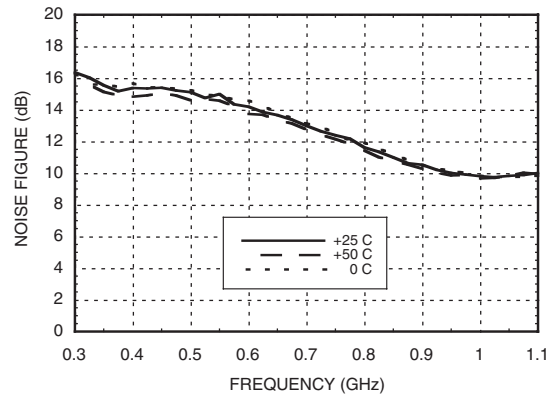
**Output Return Loss vs. Temperature**



**Reverse Isolation vs. Temperature**



**Noise Figure vs. Temperature**



**Absolute Maximum Ratings**

Supply Voltage (VIN)	+13 Vdc
RF Input Power (RFIN)	+10 dBm
Storage Temperature	-40 to +85 °C
Operating Temperature	0 to +50 °C
Thermal Fault Indicator Max Pdiss (derate 1.8 mW/°C above 50 °C)	180 mW
Enable	-0.5 to +6.0 Vdc

**Thermal Fault Indicator  
Characteristics**

Parameter	Min.	Typ.	Max.	Units
I <sub>OUT</sub> (V <sub>OUT</sub> > 2V)		350		mA
R <sub>ON</sub> (I <sub>OUT</sub> = 50 mA)			7.5	Ohms
R <sub>OFF</sub> (V <sub>OUT</sub> = 30 V)		1		MOhm



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

**Enable Input Characteristics**

Parameter	Min.	Typ.	Max.	Units
V <sub>IH</sub>	3.5			V
V <sub>IL</sub>			1.6	V
I <sub>IL</sub> @ VIN = 0V		-0.5		mA
I <sub>IH</sub> @ 5V		< ± 50		µA

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**Recommended Biasing Procedure**

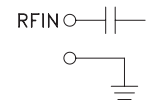
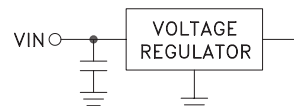

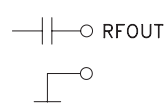

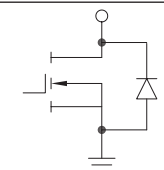
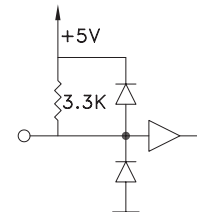
**TURN-ON**

1. Connect RF input and output
2. Apply Supply Voltage VIN (+12 Vdc)
3. Set Enable low
4. Apply RF input signal

**TURN-OFF**

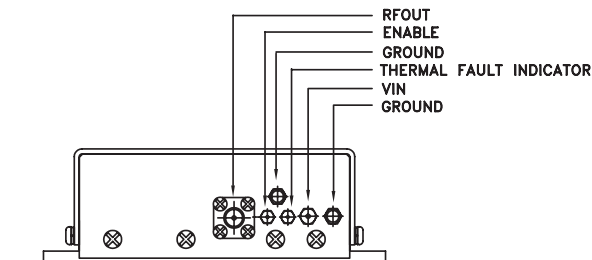
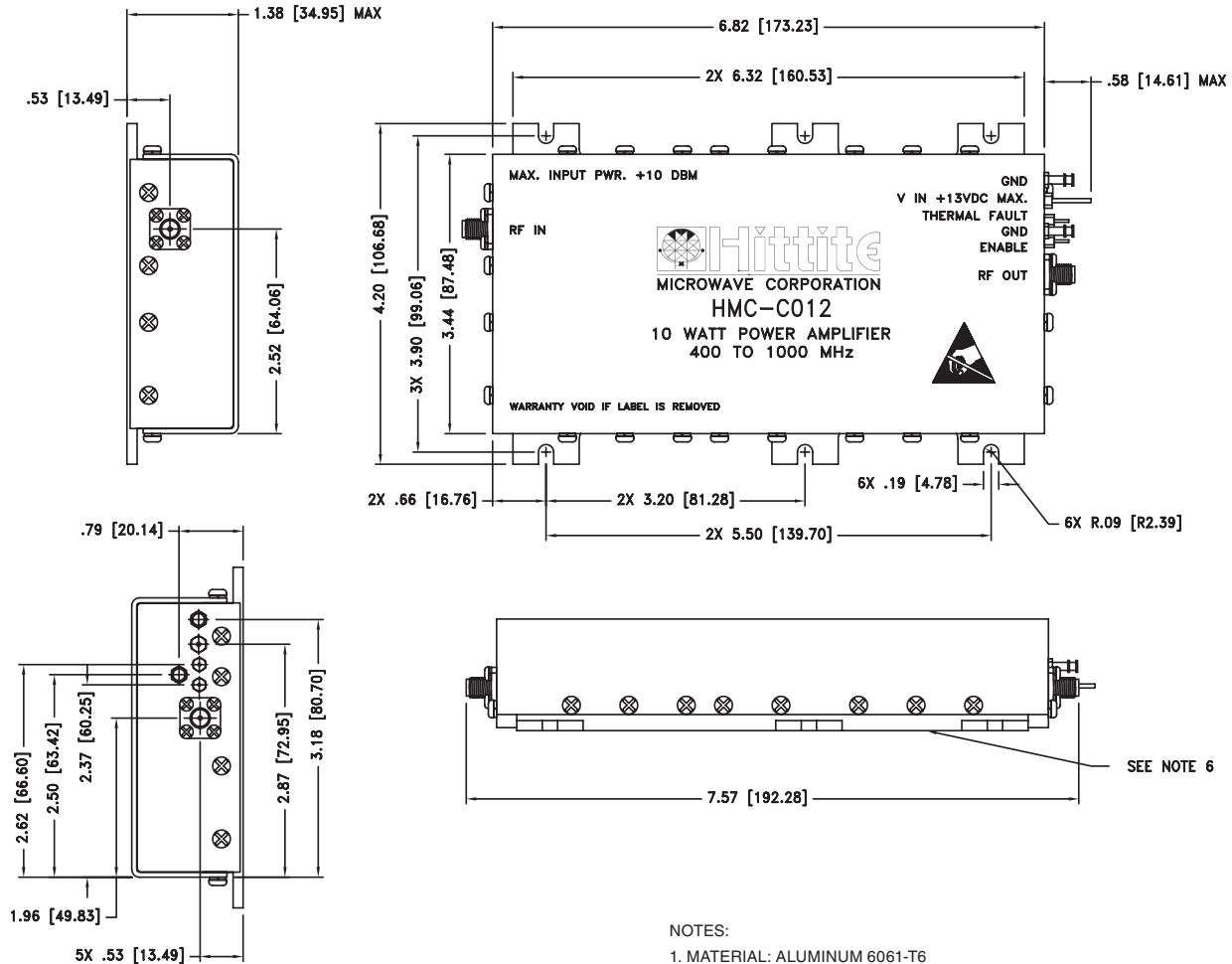
1. Remove RF input signal
2. Remove Supply Voltage VIN

**Pin Descriptions**

Pin Number	Function	Description	Interface Schematic
1	RFIN & RF Ground	RF input connector, SMA female. This pin is AC coupled and matched to 50 Ohms from 400 - 1000 MHz.	
2	VIN	Power supply voltage for the amplifier.	
3	GND	Power supply ground.	
4	RFOUT & RF Ground	RF output connector, SMA female. This pin is AC coupled and matched to 50 Ohms from 400 - 1000 MHz.	
5	GND	Ground for thermal fault indicator and enable circuit.	
6	Thermal Fault Indicator	Open drain output. High impedance for base plate temperatures less than 55 °C. Low impedance for base plate temperatures exceeding 75 °C.	
7	Enable	TTL compatible supply voltage (VIN) shutdown. If enable feature is not required, short this pin to DC ground.  TTL "High" Disable TTL "Low" Enable	

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### Outline Drawing

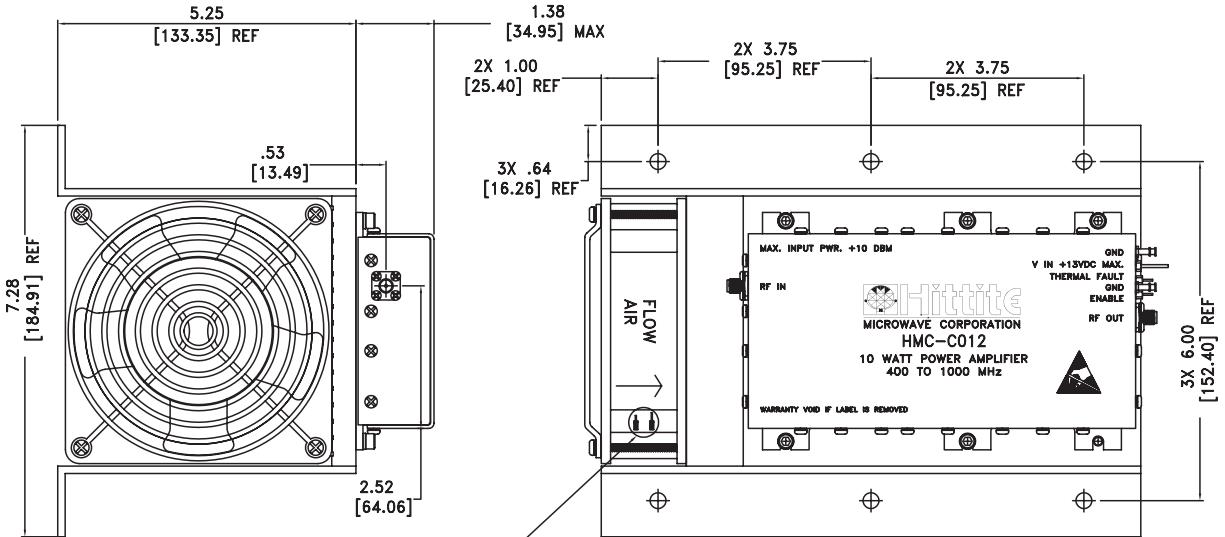


#### NOTES:

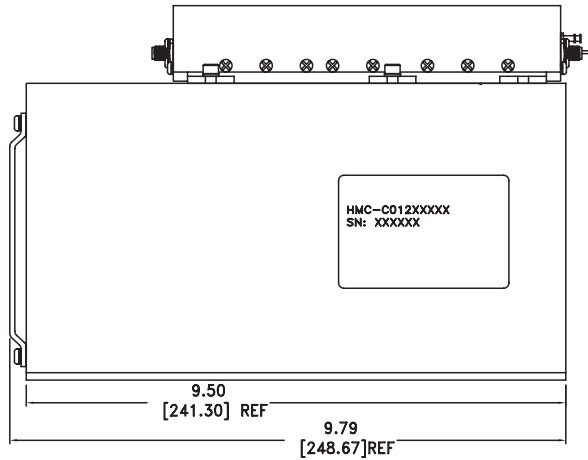
1. MATERIAL: ALUMINUM 6061-T6
2. FINISH
  - a. COVER & END PLATES, CHEMICAL FILM PER MIL-C-5541, CLASS 3
  - b. BASE, TIN
3. RF CONNECTORS, SMA STYLE
4. DIMENSIONS ARE INCHES (MM)
5. TOLERANCES  $.X \pm .1$  (2.54mm)  
 $.XX \pm .02$  (0.50mm)
6. DRAWING TO CHANGE AS REQUIRED.
7. BASE MUST BE GROUNDED AND MOUNTED TO HEAT SINK CAPABLE OF DISSIPATING 100W (65 °C)

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**HMC-C012 Heatsink/Fan Outline Drawing**



AC PLUG IN FOR FAN.



**NOTES:**

1. MATERIAL: ALUMINUM 6061-T6
2. FINISH: COVER & END PLATES, CHEMICAL FILM PER MIL-C-5541, CLASS 3
3. RF CONNECTORS, SMA STYLE
4. DIMENSIONS ARE INCHES (MM)
5. TOLERANCES .X±.1 (2.54mm)  
.XX±.02 (0.50mm)

**HMC-C008 Ordering Information**

Part Number	Description
HMC-C012	10 Watt Power Amplifier Module, 400 - 1000 MHz
HMC-C012HV115	10 Watt Power Amplifier Module with heat sink, 115 Vac fan and power cord.
HMC-C012HV230	10 Watt Power Amplifier Module with heat sink, 230 Vac fan and power cord.

